PARTNERSHIPS FOR PATHWAYS TO HIGHER EDUCATION AND SCIENCE ENGAGEMENT IN REGIONAL CLUSTERS OF OPEN SCHOOLING

D3.4

Sustained Modelling and Scenario Building Reference Guide

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1. Overview and Introduction

The Sustained Modelling and Scenario Building Reference Guide encapsulates all achievements and learnings that were made during the implementation of the Local Education Clusters (LECs). The guide provides a framework for the further exploitation of the PHERECLOS findings and their transfer into other specific models of innovative ecosystems of education with respect to regions, topics and problem areas as well as economic sectors.

The implementation and continuous advancement of the six LECs in Trieste (Italy), Łodz (Poland), Kuopio (Finland), Porto (Portugal), Medellin (Colombia) and Vienna (Austria) was one of the key components of PHERECLOS. All LEC models are based on particular missions and specific local settings, aiming to support educational systems as well as stakeholders and serve as incubators of change.

Based on the concepts of Open Schooling and Science Capital the PHERECLOS pilot LECs were initiated by Children's Universities - who have years of experience in bringing together children and university in a non-formal educational setting – a story of success in science engagement and social inclusion.

The concept of a Local Education Cluster puts schools in the centre with the aim to build up sustainable relations and mutual learning between the school system and the university/research system in order to widen and improve the horizon of experiences and learning. LECs involve schools, universities and a huge variety of different stakeholders (NGOs, companies, governmental organisations, etc.). At their starting point, they set activities on a local topic of shared interest. They also incorporate diverse schools as incubators (from kindergarten to upper secondary), explore and deploy various didactical concepts and approaches (from co-creation to problem-based learning) and a clear focus on an inclusive and gender-sensitive way of teaching and learning. The following list provides an overview of the different key aspects of the six LECs:

LEC ŁODZ
The TUL (Lodz University of Technology) LEC is one of the six clusters created in the PHERECLOS project. It consists of a university, a primary school, a foundation and the Department of Education from the City of Lodz and many new partners. It is focused on two main activities - workshops for teachers and conferences for children concerning the local labour market as the major vehicles for enabling and engaging a dialogue among all parties and stakeholders concerned in the area. The aim of the workshops was to provide the support for schoolteachers in technical sciences and career counselling, including classes on carrying out scientific experiments with children, modern teaching methods, such as Flipped Education/Classroom Model and Problem Based Learning. The conferences were held for pupils aged 10-15. During the conferences, pupils and teachers defined the actual needs of school- and post-school communities using the knowledge of the local labour market. The organization of conferences with full autonomy of pupils and under their sole lead allowed them to develop their soft skills and competences of the future by giving public presentations on topics directly related to the problems of children and youth. Special attention was given to information about the existing industries in the local neighbourhood and present and future skills, that will be necessary to engage with the professions that will thrive in the future.

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LEC TRIESTE
Trieste has an exceptional number of prestigious scientific institutions, many international, all somehow involved in outreach activities. Many of these scientific organizations were already part of Trieste Città della Conoscenza (TCC), the network for the public engagement in science and technology promoted by the Trieste Municipality. Trieste LEC started exploiting this existing network by empowering it in competences and impact, and promoting the inclusion of schools in the partnership giving them a more proactive role. Today the Trieste LEC includes nearly 30 organizations (including companies and NGOs) and 6 more have asked to join. The Trieste LEC has created, connected and made widely available the opportunities that the various institutions, but also the schools themselves, organize and offer to enable each student to get in contact with science and scientists and establish an authentic relationship with them. A tangible product, designed to collect and make accessible events, courses, materials and other opportunities for local schools - a 'digital public square', in which it is possible to encounter new partners and co-create new projects with commitment of all partners to maintain and actively us it. With the focus on inclusion and diversity, the Trieste LEC aims at having a positive and long-term impact on the community, promoting dialogue and cooperation between research institutes, schools and other local actors.

LEC MEDELLIN
In Medellín, Colombia, school curricula are focused on academic content compartmentalized by traditional knowledge disciplines with little connection to the context of students, who perceive education as a sphere disconnected from their reality. The LEC Medellin, led by EAFIT Children's University, sought to encourage students to engage with science as a useful tool to the solution of local problems through active learning experiences collaboratively designed by academia, the private sector, non-profit organizations and the public sector. The LEC partners formed eight teams, each addressing a city-relevant issue (health, environment, economic development, culture, mobility, gender equity, youth and social inclusion). In the first phase, each team defined a local problem related to their respective topic; and in the second phase, they designed and implemented a teaching unit that connected curricula with the identified problem. In the third phase, teachers participated in a training program on active learning. Thus, the LEC also encouraged, supported and promoted organizations in various sectors to recognize and explore their potential contribution to a more relevant education, which promotes the development and strengthening of life skills. The mission of the LEC was to encourage ninth-grade students to engage with science as a tool to contribute to the solution of local problems through learning experiences designed between academia, Industry, non-profit organizations and the state.

LEC NORTH SAVO (KUOPIO)
The LEC North Savo implemented an Open Schooling model of creating and distributing science educational content in the context of rural areas. Teachers, teacher trainees, researchers, experts, science journalists and children co-created inspiring science education contents such as children's articles, videos, virtual science clubs and pedagogical ideas. The participants prepared the content as part of varied LEC activities, such as university courses and new science education trainings. With the assistance of educational technology experts, the LEC North Savo published the contents on two digital platforms. The contents are openly accessible to educators and families. The fresh content is valuable for schools and is also useful for out-of-school science clubs and workshops. Especially virtual science clubs greatly benefit as they are often based on digital media content. Improving the quality of virtual science clubs is particularly valuable for families who find it challenging to attend on-site science activities due to long distances, economic situations or social reasons.

LEC VIENNA
The *Bildungsgrätzl*[1] and the Vienna Children's University (including seven universities) are two networks in Vienna that put into practise innovative education projects for young people with a strong perspective on social inclusion. Although both networks follow similar purposes, previously no direct links nor mutual support existed. Within PHERECLOS, the Local Education Cluster (LEC) Vienna connected the networks and promoted the establishment of a shared, sustainable and structural cooperation between different actors. The aim was to bridge the gap between educational sectors (primary to tertiary) alongside non-formal educational institutions. As an alliance in innovative science engagement for the future, LEC Vienna has and will even more strengthen holistic, open and lifelong learning for 10.000 children involved in Children's Universities activities and 70.000 children connected to the *Bildungsgrätzl* (BG). It will bring science in the neighbourhoods and the perspectives of children and schools in the universities.

LEC PORTO
The Porto LEC integrates institutions ready to develop new collaborations with schools open to society, providing teachers with valuable skills and promoting connections between the schools and their communities. It is based on the knowledge, expertise, and good practices of LEC partners. In Portugal, non-formal education enjoys an especially favourable context in primary schools, but it is not properly developed in higher levels of education. Due to the emphasis placed on national exams, students from the secondary level are not really motivated to be involved in non-formal activities – they prefer to focus their time studying the conceptual knowledge to achieve higher grades, which enable their college applications. For younger students, non-formal teaching and learning activities typically include visits to museums, to biological parks, to biodiversity galleries or

[1] The Austrian dialect word *Bildungsgrätzl* can be translated to „education (in the) neighborhood".

botanic gardens, to scientific centres or even geoparks. Some teachers also develop visits to companies and research centres as part of their schools' vocational orientation program.
Porto LEC involved several schools and new partnerships to welcome innovative teaching projects in schools open to society. These non-formal education exchanges gather the experience of professors, professionals, teachers, families, and students.
STEAM4E; "E" of Entrepreneurship was the project's motto. The Porto LEC aimed to foster creativity and entrepreneurship ideas among young people. The expected knowledge sharing, and the non-formal education activities were sustained by the inputs of 'storytellers' (namely market players in the areas of STEAM) and lecturers (business leaders, entrepreneurs and academics). In addition, to achieve the targeted skills efforts to collaborate with other ongoing projects in the region will be pursued, such as Youth Foundation contests about entrepreneurship and Science Exhibitions

Compiled Key Performance Indicators

Overall, the six LECs included 92 partner organisations in total, and reached a further 355 directly involved institutions in the course of the project. Additionally, many more formal and non-formal institutions and stakeholders were reached via various dissemination channels and presentations.
The variety of different institutions provide a solid basis for successfully continuing the cooperation in every LEC.

Number of	
involved universities	34
involved schools	214
involved economies/industries	36
involved NPO/NGO	33
involved gov. organisations/authorities	38
involved children	9.636
involved teachers	1.226
involved parents	2.456
involved researchers	494
involved teacher training students	155
involved policy makers	39
meetings (with LEC partners)	289
(joint) LEC activities/ interventions	578

Table 1: KPI LECs

The broad embedding of formal and non-formal institutions not only contributes to the inclusion of different expertise but also ensures the involvement of a high a number of institutions which contribute to local educational systems as a whole or which assume responsibilities.

2. Structure of a LEC

Both the initial and the aimed-for structure of a Local Education Cluster evolved in the course of the project progression. The fundamental idea of the initial structure was to enable stakeholders to jointly work on local topics of shared interests.

2.1. Initial and target structure

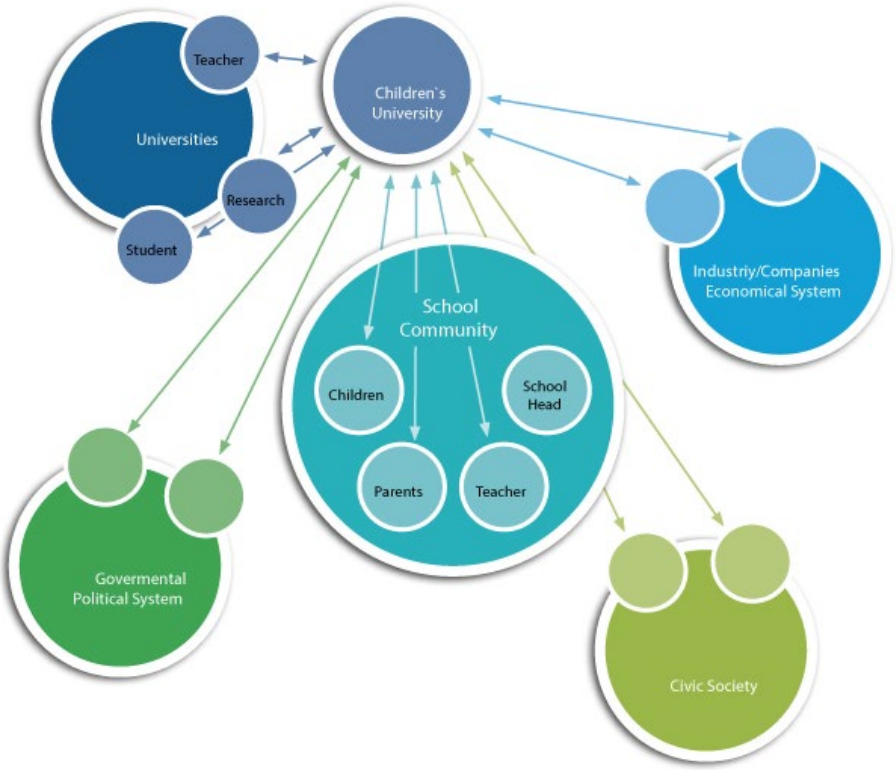


Figure 1 Initial structure LEC

Starting from the initial structure, the LECs aimed to establish learning communities in a holistic way that focus upon institutional development and put schools in the centre. New types of partnerships were established across the sectors, which created new opportunities for collaboration, based on interconnected and innovation-geared activities. In this context and based on their expertise in stakeholder management, Children's Universities took the role of mediation, of translation between the sectors and accelerated the learning. As a result, the modified structure showed the intertwinement of all local stakeholders (as depicted in Figure 2, below).

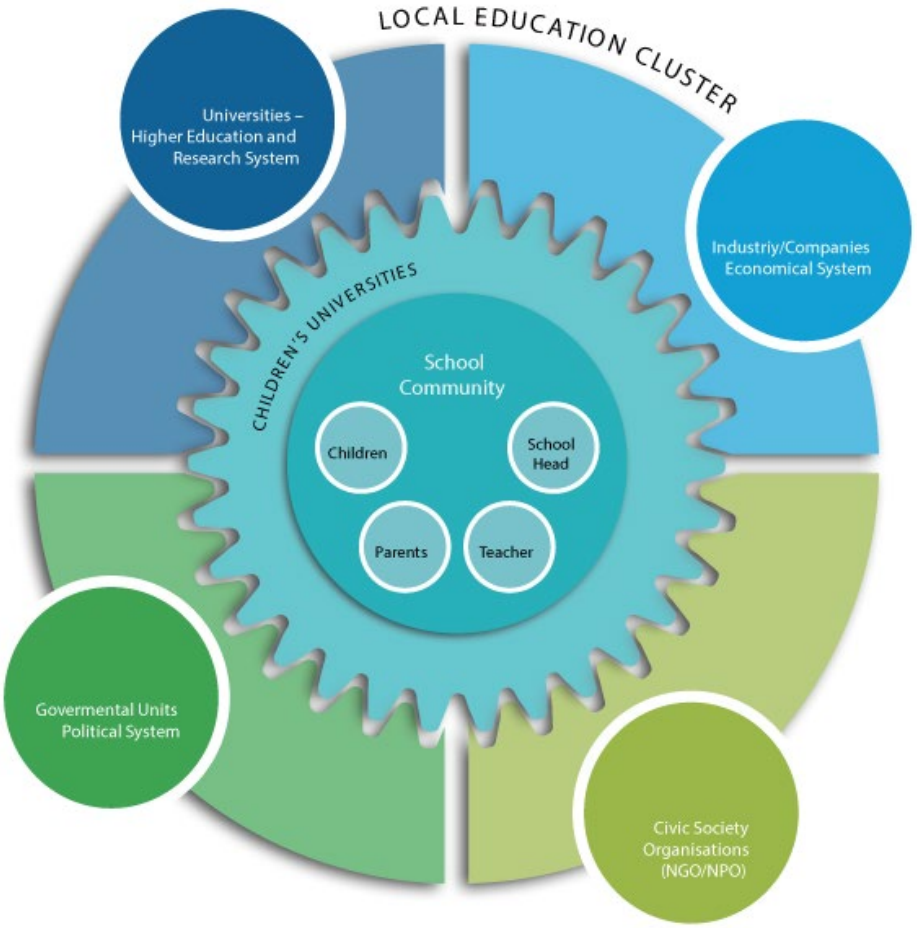


Figure 2 Modified structure LEC

Adapting the LEC structure

In the course of the implementation and evolution of the LEC, there were growing reservations about the modified structure, not being truly reflecting the relationships being developed in the respective LECs:

- Gearwheel: The depiction of the gearing wheel was too mechanical and rigid for the LEC members. This was due to the fact that developing projects with various stakeholders, many of them participating to a varying extent, is a fluid and multi-part process.
- Representation of stakeholders: All stakeholders are, both in the initial and modified structure, pictured at the same scales. In reality, particularly in the establishment and development period of a LEC, some stakeholders are less active with regard to cooperation than others. Some may be involved in multiple projects, others just singularly.

Moreover, given the nature of the gear, a stakeholder has the potential to slow down the entire development process or, in the worst case, cause its stagnation. As already stated, the LECs encourage local stakeholders from various sectors to participate and each organisation is at liberty to determine the extent. The team strives for an atmosphere that encourages all stakeholders to contribute to the success of the programme, yet if any institution opts to participate less or no longer, the development and implementation will not slow down or brought to a halt. If such a situation occurs, the LEC team is flexible to re-shift and focus to other areas or institutions.

2.2. Experienced and lived structure

In a joint process, our pilot LECs found new vocabulary that better describe an image of LECs: fluid, organic, diverse, colourful, in motion, non-linear.

PHERECLOS has revealed: LECs do not act like machines, but grow and develop in an agile way.

Therefore, a new image was developed:

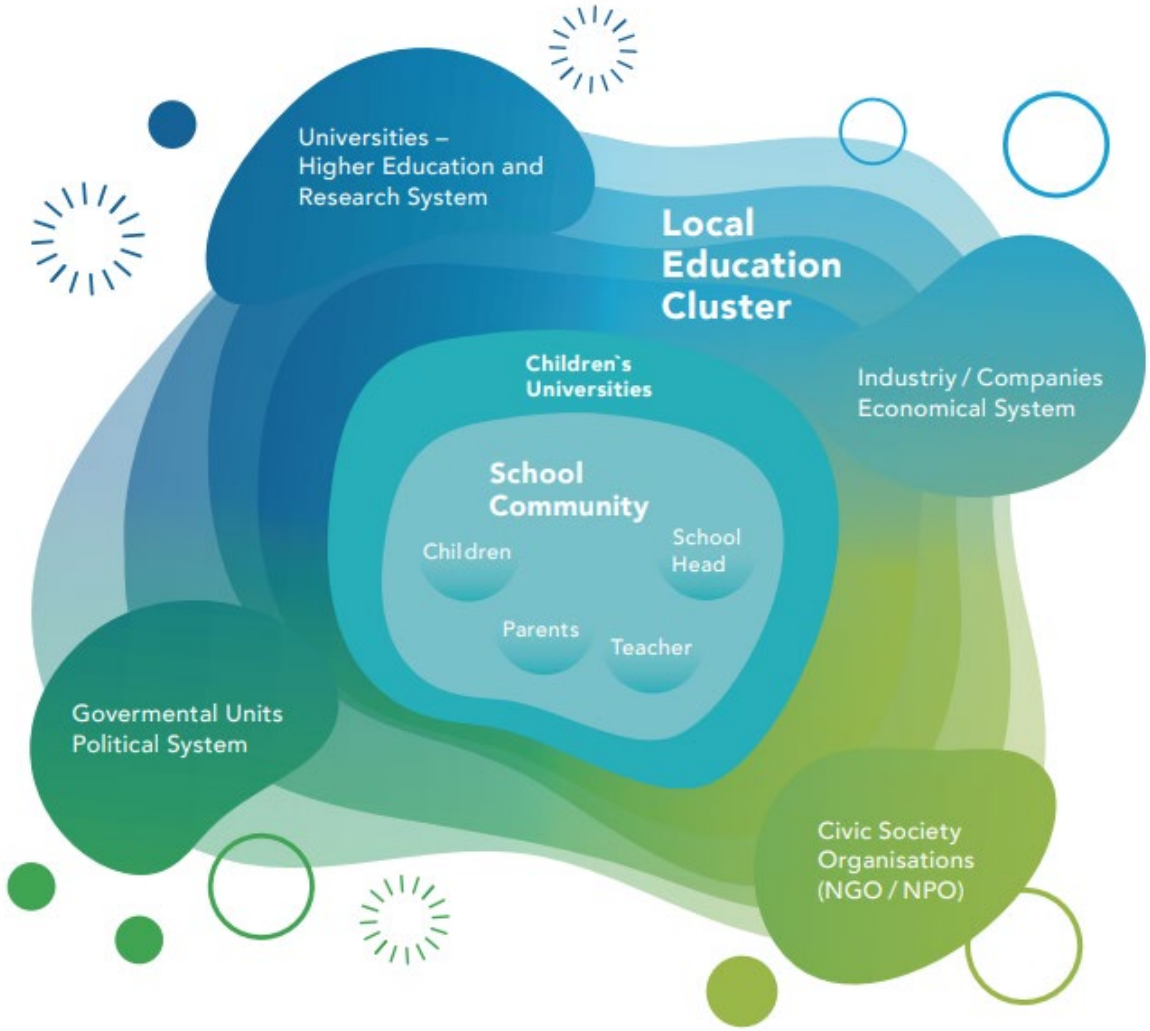


Figure 3 'Experienced and lived structure' of a LEC

The partners around the school structures remain as fluid as the activities in the schools including all members of the school community (children/young people, teachers, school heads and parents). The four headlines "Civic Society Organisations", "Governmental Units", "Universities" and "Companies" are still important keyplayers, but in a much more dynamic way, and new players appear, like journalists, refugee organisations, womens networks, voluntary groups, sportclubs….symbolized by stars and bubbles around the key dimensions. Some are more active than others, some are continuously involved, others selectively.

In conclusion, it can be noted that a LEC structure is never complete and remains in a constant state of flux, continuously evolving in a very organic way. That's why LECs remain interesting, useful and innovative places of learning for all participants in the long term.

3. Modelling and transferability

One of the purposes of this guide is to provide interested stakeholders with distilled information of the learning from the six LECs that may be transferable to other educational landscapes and environments.

This chapter includes three different distillates that provide valuable insights and assistance for the development of new LECs as well as a ‚strip cartoon' describing the evolution of the PHERECLOS LECs

- The ‚Venice Model' – to help you start
- Nine reference points for Implementation
- Twelve Factors of Success

3.1. The "Venice Model"

Under the guidance of Pietro Greco, Italian science journalist and intellectual, the Italian science community of science communicators, discussed the "Venice Model" to represent the scientific discourse circulating in the society[2]. Within the PHERECLOS project we used the „Venice Model" to describe in a very easy and compelling way the structure and roles of a LEC.

[2] Find all relevant articles on https://jcom.sissa.it/author/pietro-greco

Transferring the Venice map to the idea of developing a LEC, all the islands can be seen as different institutions. All islands have certain roles or positions position, and everywhere scientific knowledge is developed or used in a specific way. In mapping an educational landscape in this way, institutions or islands are (physically) connected via canals but without direct links in terms of projects. Some basic bridges are already in place, which represent joint projects but often these are in their infancy or not significantly active.

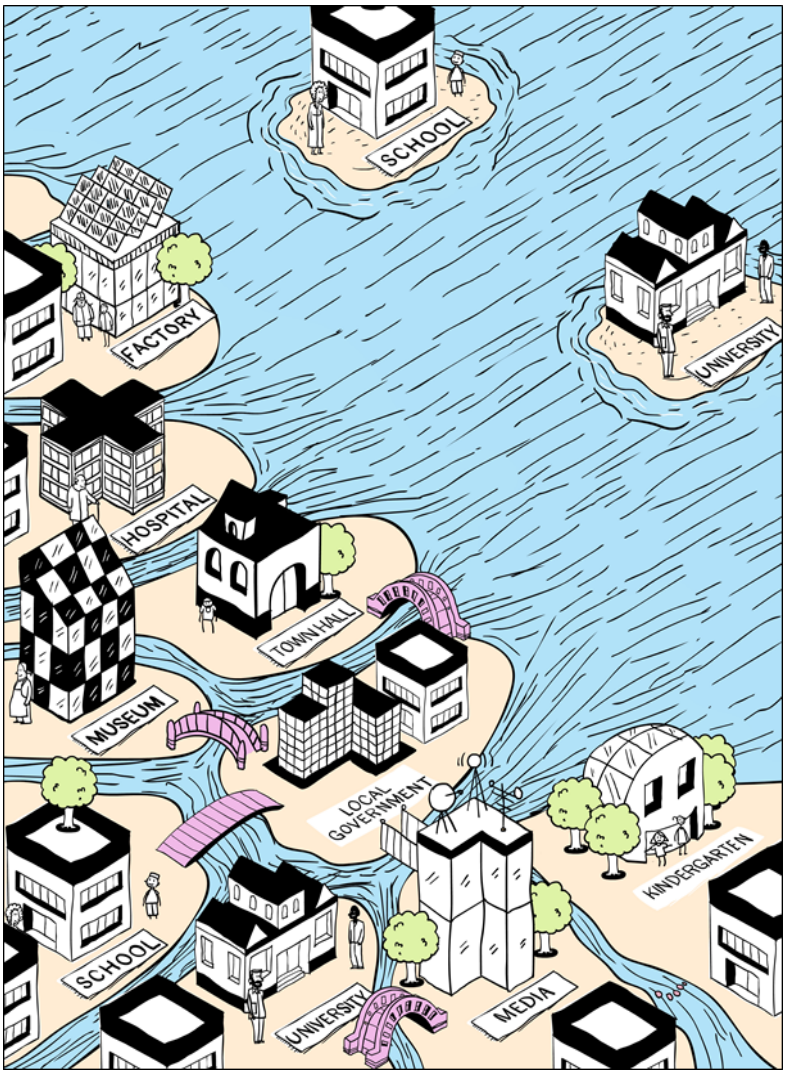


Figure 4 Starting point of the Venice Model without LEC connections (Illustration Leopold Maurer)

- Canals: there is a general connection, but no projects were conducted so far. The canals are perceived more as a segregating element and not so much as an opportunity for communication and collaboration
- Bridges: there has been a form of cooperation but not on a wider and seldom on a regular and strategic scale. Some bridges are very basic, narrow and need to be rebuilt quite often. Very few bridges have been planned and built in such a robust way, that they will last for a long time period and could l benefit a large group of people.
- Ports: there is cooperation on a regular basis, ideas for new cooperation are exchanged and traded. The organization depends on a port authority and is rather 'top-down' than 'bottom-up.'

Figure 5 A LEC ferry boat establishing closer connections between the islands (Illustration Leopold Maurer)

Since most of the islands lack proper connections (bridges) there is a need for easy and non-bureaucratic links to support the development of all inhabitants. A major task of the Local Education Clusters is the promotion of cooperation among all stakeholders. Therefore, the LECs can be expressed in the analogy of the Venice Model (and the general PHERECLOS theme) as little ferry boats with a crew of dedicated people in the beginning. They are in charge of establishing regular connections between the islands and eventually provide enough material to build and organise new bridges and manage traffic. In this interim step, the LEC is aiming to get in touch with every stakeholder, discuss their ideas and possibilities and invite them to join the cooperation.

The crew of the LEC ferry boat is flexible and consists of people with different expertise coming from diverse, professional starting points and various levels of engagement. These important roles have been structured analogous to the PHERECLOS badges:

- Sailors are people showing interest and basic knowledge in the concept of Open Schooling. Sailors support on every level and already participated in various activities, events and training related to an Open Schooling project.
- Riggers are people who take the initiative and play an active part in Open Schooling Culture. Riggers contribute, as trainers, or provide material ((e.g. didactical material), which helps to build stable connections for the future.
- Machinists are people who take care and feel responsible that Open Schooling programs are running well and without major hiccups. Machinists are involved in the programs in a deeper level and provide a secure framework for the passengers of the LEC ferry boats and can fix problems.
- Navigators are people who set the course and realise the concept of an Open Schooling program. The navigator plans the journey and advises others with knowledge about timing and

the local conditions. Navigators take care that all islands are included in the itinerary of the LEC ferry boats (making sure all stakeholders are engaged)

- Builders as essential starting points to establish the connections as they build the LEC ferry boat itself. Builders are people who create and propagate the ideas of Open Schooling with the scope of providing the first ideas and resources, bringing them into a wider context.

In the process of designing the Venice Model for the description of a LEC we also added the role of an Explorer to the LEC ferry boat crew. This is a person who explores new connections and routes.

Figure 6 Additional bridges and stable connections have been established with support of the LEC ferry boat (Illustration Leopold Maurer)

The more often the LEC ferry boat and its crew visit various island the more likely a fixed connection will develop. Regular connections support the cooperation and provide more opportunities for easy exchange and new encounters. This will bring more passengers, who will require more permanent structures for safe passage. Within the Venice Model this will result in bigger and more durable bridges that are high enough to allow for unhindered traffic beneath to enable even more flexible links and do not stop the flow of the channels.

One task of a LEC is to constantly establish new connections between various institutions and to find common ground on which all barriers have been removed and joint activities can be conducted.

The Venice Model and the LEC ferry boat with its crew is a good starting point for long-term relationships in an educational landscape. Be it a city or a rural area the model helps to reflect about the involvement of various stakeholders and their connections and how to link them on a sustainable basis.

Figure 7 The Venice Model with an elaborated system of new connections and a perspective of new Open Schooling projects beyond the borders of the LEC (Illustration Leopold Maurer)

Finally, the model also allows an even broader perspective in which the LEC boats will explore the Open Schooling waters more widely and send out additional scouting boats to make new connections and establish new links for new learning. Within the PHERECLOS project this "exploring phase" was represented by the TEMPS (Transnational Education Mentoring Partnerships) and their impact on additional education landscapes.

3.2. The LEC logbook to support your LEC development

Are you interested in shaping the local educational environment in your area and in creating a LEC to foster the system? Let's sail to new shores together! The LEC Logbook provides you with guidelines to start your own journey! It consists of nine reference points that the PHERECLOS implementation teams – with school representatives in a co-leading role - considered important during the implementation process of their LEC. Enjoy the exiting journey!

1. Aim

Before setting sail, sailors and merchants think of the situation at the point of destination and which goods and services they want to trade or get in return. Similarly when setting up a LEC, you have to take a close look at your starting point and your aim – the local destination. So before setting sail, important questions need to be considered. For example:

- What is the current situation in the local area?
- Which challenges are most urgent or prioritised by the team?
- Which formal and non-formal institutions are present in the local area?

- What kind of materials and information do you need to reach the aim?

Besides reflecting the current circumstances, it is important to think about the future impact the LEC should have:

- What kind of change do you want to initiate?
- What outcomes do you want to achieve?

Questions like these help to shape the LEC and its tasks and are furthermore important for all partners to carry out projects mutually.

2. Crew

Every ship needs a crew – so far so good. However, a proper crew is most important. The responsibilities and function on a sailing boat are different to those on a cargo ship. The same applies to the establishment of a LEC. Only with a compatible crew, can tasks be accomplished, and ideas realised. Invite the matching formal and non-formal stakeholders to realise the change you agreed on in the first step.

- Who is sailing with you?
    - School students/teachers/school heads
    - Non formal institutions
    - Policy relevant actors
    - Teacher training students
    - Parents
    - Other stakeholders
- Is there a network you can already rely on?
- Is the crew willing to accept new members?

Define and discuss the role of each member together with the expectations of each stakeholders. It is important to match this to what others expected of them. A well-defined role assignment and task definition facilitates teamwork.

3. Navigation and Compass

A central component of a logbook is the route and navigation, which are documented regularly by the crew while sailing. It is not only necessary to reflect past events but it enables an outlook regarding the next steps. Development and implementation of a LEC needs time and challenges will occur en-route. Hence, navigation tools and compass are key elements during the journey. There are several questions that will impact upon your ion navigation.Three may help e guide, two define your course:

- Which methodologies do you use?
- Which target groups will be approached?
- Which challenges do you want to tackle?

Important occurrences:

- Define milestones you want and need to achieve
- Define a timeframe and share it with all your partners

Do not forget to share your route with ‘the locals’:

- Provide status of the current situation on a regular basis to you team
- Disseminate the current results and findings among all stakeholders

4. Adaptability

Regardless of how carefully the planning of the route was in advance, you need to be prepared to adapt your journey. In case of ships and ship routes, weather conditions and strong currents can lead to changing the route. However, adaptions may also lead to positive effects! All six PHERECLOS LECs adapted their initial workplan and it turned out to be one of the key success factors in the long run.

Necessary adaptions of your LEC could occur due to:

- Political changes,
- Structural changes (team members are no longer participating)
- Societal circumstances
- Stakeholder involvement (stakeholder(s) will no longer participate)
- New ideas of partners
- New important topics arise
- New partners are on boarding

So, do not be afraid of adaptations and make sure your teams stays agile!

5. Emergency Plan

If your compass is out of order or you are stuck on a sandbank: Use your emergency plan. Be aware of:

- Where to get help
- Use a backup plan and adjust your project
- Prioritise your tasks
- ensure you have a risk assessment

6. Pilot

Always remember: You and your team are not alone! Foreign ships will be piloted through canals and straits by experts or carried by a tugboat and you too can rely on help.

- Ask advisors to gain different perspectives and ideas or when challenges occur. They are experts in their fields and know the latest research
- Consult external stakeholders/experts: Do you need help to reach your target group? Are you uncertain of the way you want to implement your LEC? For every challenge, there are institutions to support your team
- You have various expertise in your team! Use this strength!

7. Catch the wind

You have worked hard to develop the LEC and reach your goals – now it is time to use the momentum and exploit the opportunities. Your LEC will take off with a tailwind!

- Use the support you get for sustainable (structural) change
- Promote your LEC in the local community
- Start expanding the network
- Apply for additional funding
- Prioritise your tasks to use the wind and sail further (if appropriate)

8. Dropping the anchor – Tie the ship

After a varied journey, the ship arrived at its destination. It drops the anchor and is tied to the port. Our LEC too reached the goals and it is time you think about the next steps

- Implement your sustainability plan
- Everyone needs to know you are in port! Disseminate your achievements and your outcomes. Let visitors on board and expand the network
- Merchants are constantly looking for goods and services: think about next projects and develop new ideas with your expanded network
- Guide other LECs with your knowledge and experiences

9. Reload the ship and aim for your next destination

Your journey starts again. You have new partners and the loading area is full of ideas. Prepare for your next project and set sail! Hopefully, our seaways cross one day to trade knowledge and maybe sail part of the way together. Online tools enable this to happen far more readily than the mariners of the past who had to physically pass.

3.3. The 12 Factors of Success

The upcoming 12 factors for successful collaboration and innovation in education were distilled in multiple discussions with the six LEC teams and are considered as important for a successful and sustainable implementation. Especially in the beginning of the development or after necessary adaptions, these factors can provide a framework you can rely on!

1. Common motivation is the starting point

The **unifying element of each participating LEC institution is passion** for adapting the present local educational system and motivation of all stakeholders to contribute to bring about change in the system. Maybe there is a challenge in the area, maybe organisations are struggling with circumstances, maybe there is simply enthusiasm to learn from one another. The starting point for the learning journey is an open conversation on the needs and aspirations of the partners and a discussion of the strengths of both formal and non-formal educational system. The result is meaningful learning!

Reflect, how all the institutions can benefit from the cooperation and what the added value for the community is. Use this motivation to start and shape a mutual process of developing a system which supports and prepares the education system for the future challenges.

2. Giving opportunities not solutions, more listening than knowing in advance is the attitude

Far too often, schools, teachers and students hear about solutions to their problems. Ready-made concepts and elaborated ideas are brought to schools with the intention of supporting schools and contribute to broadening the thematic scope.

Well-meant, is not always well done!

Open Schooling LECs see themselves as open and honest facilitators of a process with the objective of mutual learning, which requires listening and attention to the culture and problems of all participants. For a LEC coordinator, it is important to facilitate as many opportunities for dialogue as possible in order to create joint solutions in a creative process that provides rich of learning for all.

3. Co-creation is the way

Children, teachers, teacher-training students, researchers and many more stakeholders are all part of a LEC. Each of them are experts in their field and have important knowledge that can be used to set up a LEC that empowers all institutions to thrive and that is designed to address the need of the local community.

The co-creation methodology ensures the integration of all voices and visions included in the process of the LEC development. What all adults have to learn is to "**rely on the creative power of children"** in generating ideas, trust them in their decision making, dare to have a dialogue with them, invite them to investigate their questions and listen to their ideas.

4. Teachers are the key

Developing new and adapting existing learning scenarios need to be conducted in close consultation with teachers. A sustainable and long-term cooperation can have impact on the methodological way of teaching as well as imparting new learning content.

The role of teachers comprises both **leaders of learning** as well as **capacity building** for children. As experts regarding the every-day school life, they are the engines of adjustments, and therefore crucial for the development of a LEC.

Being ready to reflect, to learn and to change is key for innovation – both on the side of educators and learners – and those teachers are most capable of becoming true agents of change who are able to take both positions in a learning scenario.

5. Openness to the unplannable and flexibility brings everything into flow

Setting up a LEC is a long-term task, starting with a plan. But learning cannot be rigidly planned and the adaptation of the initial plan has to be part of the process. Adaptability may become necessary both due to structural developments like political changes or institutional changes as well as due to adjustments to accommodate new ideas and emerging issues. Co-creation is based on curiosity and innovation and triggers **surprises, changes and unintended outcomes**.

Being agile and responding to recent developments are important elements for the successful evolution of a LEC. Openness to the unplannable and flexibility is not only the plan, but also a strength to be embraced!

6. Diversity and inclusion of everybody is the glue

If we want to make new connections possible in an education cluster with enrichment for all, it is also important to bring together different perspectives. **Without differences and distinctions, there is no learning**! A truly inclusive community.

Learning from different perspectives requires courage to bring together people from different backgrounds, to work on the differences and to tolerate that some perspectives will remain different. In order to benefit from diversity, it is important to live inclusive strategies. Inclusion is the key to make everyone feel their voice is being heard and giving opportunity to all to actively participate in the learning process. The better this is achieved, the more successful the learning will be.

7. Caring culture brings coordination and structure

Learning in a LEC needs people who care about the process of learning, who know how to keep the process active, take into account different perspectives and needs.

A caring culture is an organizational culture in which leaders consistently act in ways that help all LEC partners to thrive, and they themselves consistently act in ways that help others to thrive.
For all stakeholders in the LEC to get the best support possible and to participate actively, that also includes transparent structures, shared understanding, **a culture of respect** and mindfulness!

8. Activation and engagement builds capacity

Doing things together creates a lot of new scope for everyone involved. An idea from a child can become a project for a company, a school activity can become food for thoughts for politicians. The commitment of all participants motivates them to try out new things in a meaningful way.
The result of the creativity of all stakeholders involved are didactical innovations, new ideas for research projects, adapted lessons and curricula.
A LEC can let you feel that enthusiasm is contagious and encourages innovation.

9. Local action opens new spaces for thoughts

Think global – act local. LECs are most successful when tackling local needs and challenges and therefore contribute to the transformation of the educational system in their neighbourhood. The emphasis on local circumstances enables all stakeholders to share their individual experience and ideas for tackling regional challenges.
A global perspective may help to understand local challenges and bring new ideas to solve problems. LECs may learn from each other, when they ask themselves questions like: Which measures have proven to be successful in similar cases? Which measures are transferable?

10. Critical mass gives weight

How big does a LEC need to be to be successful? The sheer amount of partners is no indication of its likelihood of success. Our LECs had between 2 and 32 partners! Your success is more likely to be judged by your outputs
In physics, critical mass is defined as the minimum amount of fissile material needed to maintain a nuclear chain reaction.
A LEC is not about nuclear, but about **sustainable chain reactions**. If the LEC idea is passed on from mouth to mouth and reaches groups that previously had nothing to do with each other, the significance of LECs becomes ever deeper and the sphere of influence ever wider!

11. Innovation, common understanding and enthusiasm are the engine

Tired of "more of the same"? LECs and the open schooling approach give the opportunity to try out new ideas and to change perspectives in a new way of cooperation with institutions who have never worked together before. They have faced new challenges and tackled innovative topics, where everyone can contribute with his or her individual perspective and expertise.
The recipe: Mix fun with innovation, celebrate failures, bring together a community of committed people and transform your learning supported enthusiastically by numerous institutions. The mixture stands for an exciting and ever evolving project!

12. Knowledge on implementation and advocacy supports sustainability and growing

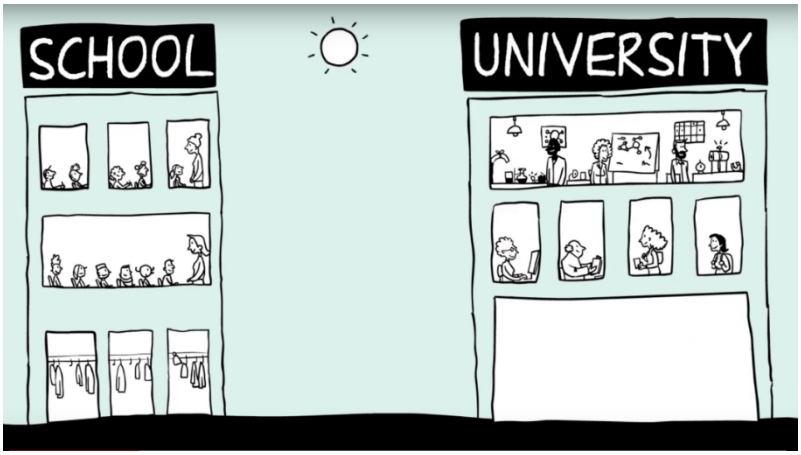
LEC activities are not only based on intuition, a bundle of activities or the use of the momentum of bringing people together; LECs are clusters of different stakeholders, who organise new learning with planned activities, a shared vision and a commitment to build a stronger network.

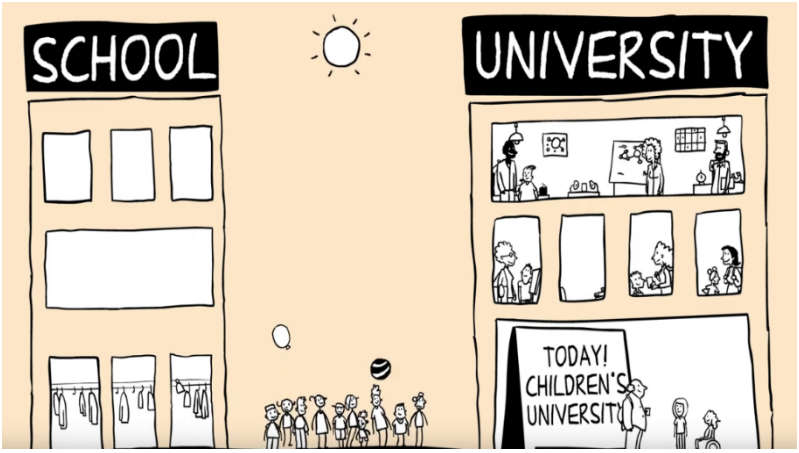
Therefore, sustained reflection about how to design and implement a cluster is needed. Concepts of implementation research are important to reflect the organisational development in the beginning of implementating a LEC, but also in the phase of running a LEC. Knowledge about advisory support is helpful for the development of sustainable strategies and tackling challenges en-route. Access to advocacy documents, can be a framework around which to build your ship and with recourse to this knowledge, LECs will not only **grow and develop**, but also become **established** and **implemented sustainably** as learning hubs for all.

3.4. Evolution of the PHERECLOS LECs

Chapter 3.4 provides a graphic representation (by Leopold Maurer) of the evolution of educational landscapes via the LECs. Can you relate to some of the figures? If so, why not considering starting your own LEC and help shaping your educational system for the benefit of future generations!

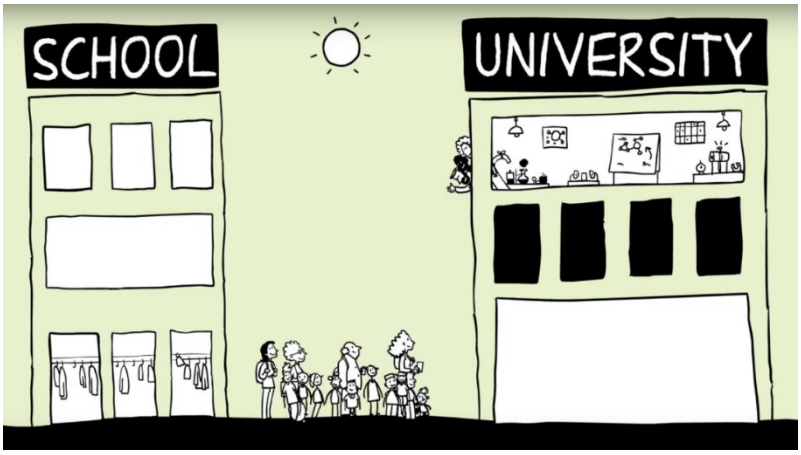
Present structure of a conventional educational landscapes

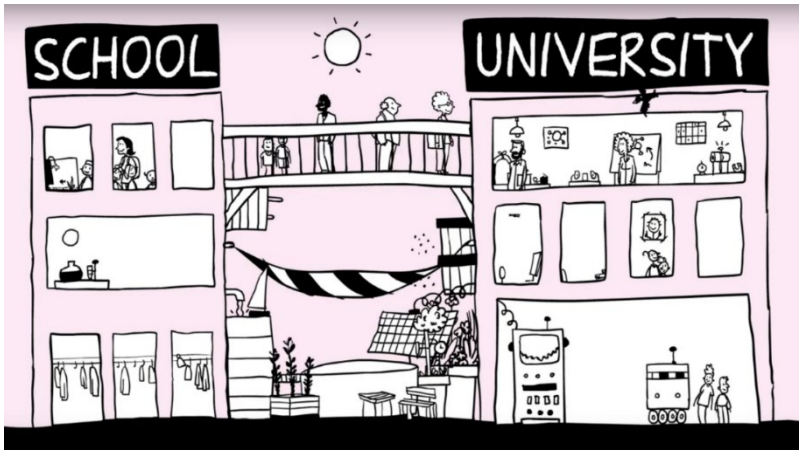




Children's Universities as hubs for innovations

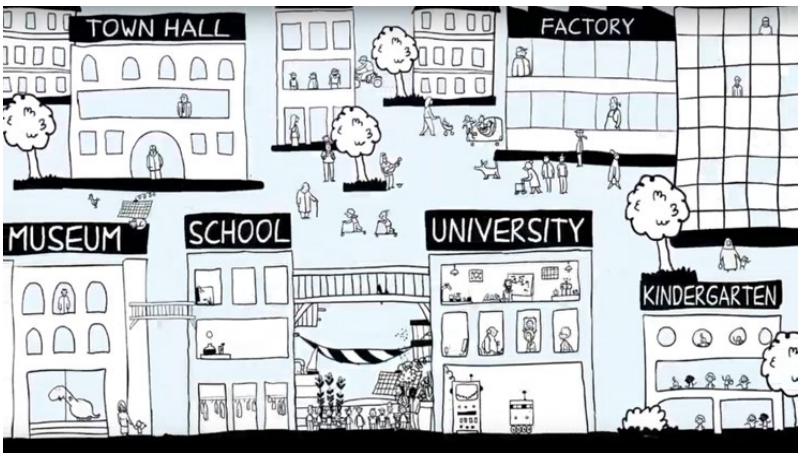
Establishing a framework

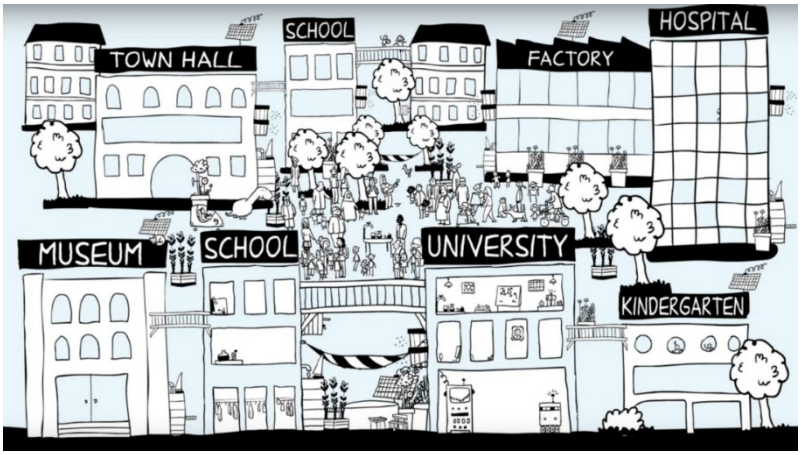




Setting up a sustainable partnership

Expand the network





Open Schooling approach via the LEC

3.5. Setting sail! Developing the educational system via LECs

After building bridges, connecting formal and non-formal institutions and setting up sustainable and vivid networks the LECs are trying to remove as many barriers as possible. Therefore, out of the canals, bridges and ports, an environment is created that is accessible to all stakeholders. All LECs are aiming to set up a common and supported framework where joint projects can be developed and implemented. Within this space a learning community can evolve and the LECs serve as incubators of change.

The PHERECLOS LECS illustrate a scenario whereby following their successful implementation the open schooling approach has been realised. As for the schools, which are in the centre of the LECs, it implies that they are operating in a way that reflects external ideas, topics and challenges and incorporates them in their teaching approaches and everyday school life. In return, their pupils and teachers provide creativity and are potential assets to the community around them.

Thinking education ahead – why collaboration in education at a local level?

This Model Guide is outlining requirements and opportunities for innovative and successful collaboration among various education and knowledge providers on a local level for the enhancement and diversification of formal education under the perspective of a collaborative approach to "Open Schooling".

Piloting of model collaboration within the six Local Education Clusters (LEC) as part of the PHERECLOS approach have revealed the potential when actors from different societal sectors, from different educational levels or different professional backgrounds combine their skills and ideas to the field of local education. What has also become apparent is that this pilot implementation has contributed to initiating a change in the institutions involved (For more details and outcomes see *PHERCLOS White Book on Open Schooling Education Clusters* available on www.phereclos.eu).

But how do these models resonate with the global trends in education and how the future of schooling is perceived?

In 2020, after PHERECLOS had started its endeavor in innovating educational collaboration across six model regions, the OECD published its report[3] on a possible future of education and it outlined four

[3] OECD (2020), Back to the Future of Education: Four OECD Scenarios for Schooling, Educational Research and Innovation, OECD Publishing, Paris, https://doi.org/10.1787/178ef527-en

possible scenarios and described them in the context of the role of institutions and educationalists, the pervasion of technology into everyday life, potential social and political developments as well as grand challenges – either predicted or totally unexpected – which may have an impact on likely or unlikely these scenarios are. This takes into consideration e.g. the recent Covid19 Pandemic, natural disasters and climate change, economic crises, war and cybercrime or the dependency or risks associated with online connectedness, artificial intelligence or machine learning.

The four scenarios range from a model where schooling is more or less extended from the current status, where schools continue a classroom-centered approach with some more flexibility in the curriculum (despite other trends towards uniformity and standards) and greater diversification of professional profiles and roles of the educators in schools, also in face of digitalisation which allows more emphasis on supporting emotional learning and motivation to learn – but all in all, the "formal certificates" continue to be the main passports to economic and social success.

On the other side of the spectrum the OECD drafts a scenario where traditional schooling totally dissolves in an environment where education takes place anywhere and anytime, driven by the rapid advancement of artificial intelligence and augmented reality. In this setting, schools do no longer have the role of being a sole provider of certification and the remaining infrastructure is used more flexibly and open, but limited to alternative childcare arrangements where virtual learning is enabled and monitored in a smart environment. Professional educators are no longer needed and distinctions between education, work and leisure become blurred.

So where is the PHERECLOS approach located within this spectrum of scenarios?

The OECD has drafted a model where schools – different from the latter, rather utopian scenario – retain their basic traditional functions but become learning hubs as authority in education becomes more decentralized and local actors come up with distinct initiatives which are relevant in a local setting. Schools are perceived as relevant and successful, if they have strong connections within the community around them. This brings about less uniformity in the school system and allows for more flexible schooling arrangements with more personalisation and more community involvement.

However, as different regions and different communities are characterized by different resources with respect to social, cultural, economic and scientific infrastructure and capacity, a strong regulatory and strategic framework is required on all levels (local, regional, national, international) – including targeted funding and investment – in order to compensate this.

What makes this scenario so unique compared to others is that schools as institutions get an even stronger role than nowadays and become "*the centerpiece of wider, dynamically evolving local education ecosystems, mapping learning opportunities across an interconnected network of educational spaces. This way, diverse individual and institutional players offer a variety of skills and expertise that can be brought in to support student learning.*" (ibid.)

In this scenario, the role of both professional and non-professional educators is highlighted, with a strong focus on local values, local decisions and diverse partnerships – more than on standardized curricula. Similar as for the role of institutions, this future scenario – different to the other ones described by the OECD – also assumes increased importance and trust in the role and competencies of educators as enablers of learning experiences and educational pathways. Obviously, this calls for an enhancement of in-service and pre-service teacher training in order to prepare them for various forms

of collaboration with non-professional knowledge providers when "*[…] strong partnerships are also welcomed as schools seek to leverage the resources of external institutions, such as museums, libraries, residential centers, technological hubs and others. […] Teachers with strong pedagogical knowledge and close connections to multiple networks are crucial.*"

PHERECLOS is happy and proud that many of these aspects were already anticipated from the start of the project in 2019, with the aim of piloting and showcasing such innovative forms of collaboration in education and of implementing them in a systematic, concerted and sustainable way. The 12 criteria for successful implementation which are outlined herein , encapsulate the learning which derived from our piloting and together with the models we describe should help others implement their own journeys into Open Schooling in the future in a more enlightened way.

So what else is needed for scaling up collaboration in education at local level in the future?

In the scenario outlined above, some fundamental questions remain in order to estimate how realistic it is for the future and which signals from the present are available which point in this direction.

- Will strategic collaboration between formal and non-formal sectors in education lead to an erosion of formal credentials from primary to tertiary education?

Even though PHERECLOS has focused on building bridges between various knowledge and education providers in a region, it did not really tackle the matter of traditional certification. However, PHERECLOS was tested an badge ecosystem for issues virtual credentials of particular knowledge and skills that were obtained during the implementation process of the Local Education Clusters (LEC), mostly for practitioners and representatives of the involved parties (https://www.phereclos.eu/badges-handbook/). The results are promising and elements of such an credential ecosystem could be transferred to the school sectors and be used within certain scopes, however national legislation is still hindering the further uptake of such alternative means of assessment (also see: *PHERECLOS Policy and School Structure Inventory* on https://cordis.europa.eu/project/id/824630/results).

If skills are more separated from formal certification, will this allow for more flexible learning choices or less predetermined learning paths towards either general of vocational learning tracks?

Again, PHERECLOS has presented and laid down principles for how to successfully launch and accomplish implementation processes, which lead to more systematic and more strategic collaboration between knowledge and education providers of various kinds. These would basically allow for serval forms of educational pathways and their accreditation, as long as they are in alignment with national legislation. PHERECLOS has developed a set of policy briefs, which may help to create a deeper understanding and awareness for more flexibility and less standardization and uniformity in the assessment of learning outcomes and achievements (https://www.phereclos.eu/policy-briefs/)

- If schools are to become learning hubs in their communities, can this also counteract social segregation and polarization in a neighborhood and strengthen a feeling of belonging, including intergenerational learning and volunteer work as a means of social cohesion and acquisition of social capital?

PHERECLOS has not explicitly pursued an intergenerational approach within all Local Education Clusters (LEC). However, there is profound knowledge available from the model of Children's Universities, where some lighthouse initiatives have made intergenerational learning a central

component in their approach and mission. As Children's Universities have taken the role of incubators of change within the LEC composition in PHERECLOS, this aspect can still be added to the systematic formation of a learning community. Mentoring turned out to be a suitable and effective vehicle within the overall PHERECLOS concept, where 44 institutions have engaged in then transnational mentoring partnerships (TEMP) in 15 different countries, which definitely helped to inspire new and diverse institutionalized relationships in these countries, including several forms of collaboration between schools and the communities around them.

- The outlined scenario of schools as learning hubs assumes that traditional governance mechanisms in schooling becomes less pertinent and "*more purpose oriented, horizontal, collaborative and iterative ways of teaching and learning*" will emerge, including models of service-learning and citizen science. What would this scenario imply for the role of professional educators and could they be the "game changers" for innovation in education?

PHERECLOS as a pilot initiative may not have the potential to immediately create a chance in national education systems and policies, also taking into to consideration the limitation due to legislative requirements, which are in place. (see: *PHERECLOS Policy and School Structure Inventory* on https://cordis.europa.eu/project/id/824630/results). However, PHERECLOS has eminently uncovered the central role which teachers have in changing the education systems towards more flexible and collaborative forms: Teachers are key and the role of teachers comprises both leaders of learning as well as capacity building for children. As experts regarding the every-day school life, they are the engines of adjustments, and therefore crucial for the development of a LEC. PHERECLOS has encapsulated these requirements and recommendations for pre-service and in-service teacher training in the "*Teacher Training Innovation Toolkit on Open Schooling*".

4. Further information

Do you want to find out more information regarding PHERECLOS, the Local Education Clusters and the open schooling approach? The PHERECLOS consortium provides a set of information to support your activities!

Find all information here: https://www.phereclos.eu/

Learn more about our various initiatives: https://www.phereclos.eu/initiatives

If you want to promote the open schooling approach among your stakeholders: Find our policy briefs focusing on thematic areas: https://www.phereclos.eu/policy-briefs/

Curious to find out more about the evolution of a LEC and the open schooling approach? Take a look at our video on YouTube: https://www.youtube.com/watch?v=MVchWdJAIAE

5. Bibliography

Greco, Pietro: Collected Articles: Journal of Science Communication: https://jcom.sissa.it/author/pietro-greco

OECD: Back to the Future of Education: Four OECD Scenarios for Schooling, Educational Research and Innovation, OECD Publishing, Paris, https://doi.org/10.1787/178ef527-en

6. List of Tables

7. List of Figures